CLAIMS

1. A remote sound detector (10), comprising

a transmitter operably arranged to produce a train of signals (18) and to transmit the signals (18) into a region of atmosphere (21) as a beam (20) and

a receiver (24) operably arranged to receive resultant signals (23) from the region of atmosphere (21), characterised in that,

the transmitter (19) produces a train of pulse to pulse coherent signals (18),

the receiver (24) is arranged to receive any resultant signals (23) from the intersection of the beam with acoustic signals in the region of the atmosphere (21), and

a detector (29) is operably connected to the receiver (24) and arranged to determine the presence of acoustic signals from the phase difference between successive resultant signals (23).

2. A remote sound detector (10), as in Claim 1, wherein the detector (29) determines phase differences between immediate successive pairs of resultant signals (23).

3. A remote sound detector (10), as in Claim 1 or 2, wherein a laser source (11) is operably arranged to produce a laser beam (12) and the laser beam (12) is modulated

by a modulator (14) to produce the train of signals (18).

4. A remote sound detector (10), as in any preceding claim, wherein the beam (20) is directed to a region in the atmosphere (21) above possible sources of acoustic signals hidden from a field of view of an observer.

5. A remote sound detector (10), as in Claims 3 or 4, wherein an interferometer (26) is operably arranged to provide an interference pattern (28) between the laser beam (12) and each resultant signal (23).

6. A remote sound detector (10), as in Claim 5, wherein a photoreceiver (29) is operably arranged to detect and produce an output signal (30) corresponding to changes in each interference pattern (28).

7. A remote sound detector (10), as in Claim 6, wherein a sampler (31) is operably arranged to sample the output signals (30) from the photoreceiver (29) and a comparator (34) is operably arranged to compare output signals (23) from immediate successive pairs of outputs from the photoreceiver (29) to produce a result (35).

8. A remote sound detector (10), as in Claim 7, wherein an accumulator (36) is operably arranged to accumulate each result (35).

9. A remote sound detector (10), as in Claim 7, wherein a loudspeaker (38) is operably arranged to reproduce an audible output of the result (35).

10. A remote sound detector (10), as in Claim 6, wherein a sampler (31) is operably arranged to sample the output signals (30) from the photoreceiver (29) at different ranges to the regions (21) and a processor is arranged to determine the curvature of an acoustic signal wavefront from a possible source, to determine a first circle from the wavefront substantially perpendicular to the beam (20) which intersects the acoustic signal, to calculate a second circle as for the first circle with a beam (20) directed to a different region (21) and to locate the possible source of acoustic signal as the point that the first and second circles join.

11. A remote sound detector (10) substantially as described with reference to the accompanying drawings.

12. A method of remote sound detecting, comprising

transmitting a train of signals (18) into a region of atmosphere (21) as a beam (20) and receiving resultant signals (23) from the region of atmosphere (21),

characterised by,

including transmitting a train of pulse to pulse coherent signals (18) into the region of the atmosphere (21),

receiving any resultant signals (23) from the intersection of the beam (20) with acoustic signals in the region of the atmosphere (21), and

determining the presence of acoustic signals from the phase difference between successive resultant signals (23).

13. A method, as in Claim 12, including determining the phase difference between immediate successive pairs of resultant signals (23).

14. A method, as in Claims 12 or 13, including producing the train of signals (18) by producing a laser beam (12) and modulating the laser beam (12).

15. A method, as in Claims 12 to 15, including directing the beam (20) to a region in the atmosphere (21) above possible sources of acoustic signals hidden from a field of view of an observer.

16. A method, as in Claims 14 or 15, including providing an interference pattern (28) between the laser beam (12) and each resultant signal (23).

17. A method, as in Claim 16, including detecting and producing an output signal (30) corresponding to changes between each interference pattern (28) .

18. A method, as in Claim 17, including sampling the output signal (30) and comparing output signals (30) from immediate successive pairs of output signals (30) and producing a result (35).

19. A method, as in Claim 18, including accumulating each result (35).

20. A method, as in Claim 18, including providing an audible output of the result (35).

21. A method, as in Claim 17, including sampling the output signal (30) at different ranges to the regions (21), determining the curvature of an acoustic signal wavefront from a possible source, determining a first circle from the wavefront substantially perpendicular to the beam (20) which intersects the acoustic signal, calculating a second circle as for the first circle with a beam (20) directed to a different region (21) and locating the possible source of acoustic signal as the point that the first and second circles join.

22. A method of remote sound detecting substantially as described with reference to the accompanying drawings.